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Mineral Composition, Power Analysis, Physico And Phyto Chemical Characterization Of *Cocos nucifera* Oil.

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ABSTRACT

The present study was carried out to evaluate and compares physico chemical parameters, phyto-chemical components, acid value, saponification, free fatty acid and peroxide values, mineral composition and power analysis of different samples of coconut oils. It has been found that there are only slight differences between three samples involved in this research. This study focused on analysis of different parameters like, Saponification value (6.23, 7.75, 8.21), Peroxide value (9.98, 10.02, 11.06), free fatty acid (23.58, 22.63, 25.97), Acid value (0.79, 0.97, 0.86), Iodine value (42.6, 46.8, 44.6), Specific gravity (0.93, 0.95, 0.89). In phyto chemical study all these samples contain Flavonoids, Saponnins, Steroids, Terpenoids and Phenols, Tannins, Phlobatanins, Cardiac glycosides, Anthraquinones are absent. In the analysis of mineral composition the amount of zinc found (0.23, 0.42, 0.32), amount of Iron (1.75, 1.58, 1.67), amount Copper (0.03, 0.07, 0.05), amount of Manganese (0.17, 0.15, 0.12), amount of Calcium (1.58, 1.36, 1.29), amount of Potassium (2.87, 3.23, 2.98), amount of Sodium (2.13, 2.78, 2.35) in three types of samples.

eywords: Phyto chemical study, Physico chemical parameters, Coconut oils, Mineral composition and power analysis.

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INTRODUCTION

The coconut is the most extensively grown and used nut in the world and the most important palm. It is an important commercial crop in many tropical countries, contributing significantly to their economies. The chief product is copra, the source of coconut oil used for making soap, cooking oils and margarine. Much of the seed kernel is consumed locally for food. [15-17]

Coconuts and the oil content are believed to be rich in various constituent by traditionalists. Although, many researchers have worked on coconut kernel oil, yet there is need for increased utilization and awareness about its health, nutritional and industrial benefits. This research work is aimed to justify the pharmacological and nutritional attribute of the coconut kernel oil.

The electrical properties of coconut oils are close to those of conventional insulating fluids. Coconut oil based lubricants offer significant environmental benefits with respect to resource renewability, load toxicity and provide satisfactory performance in the wide array of applications. Coconut oil could be an appropriated response to environmental safety and health problems and could also reduce the exploitation cost of mechanical parts.

MATERIALS AND METHODS

Analyses of Physicochemical Properties: The analyses involves the estimation of-Saponification value, Acid value, Peroxide value, Iodine value, Free fatty acids, Specific gravity, Smell and Appearance of the oil were carried out in the present study.

Analyses of Phyto chemical components: [1-8] involves the screening of Flavonoids, Phenol, Tannins, Saponins, Phlobatannins, Alkaloids, Steroids, Terpenoids, Glycosides, and Anthraquinones.

Determination of Mineral Elements: [9]The elements were extracted from the oil by the wet digest method. The digested sample was analysed for the elemental composition using Atomic Absorption Spectrophotometer (AAS) and Flame Emission Spectrophotometer (FES). Zn, Fe, Mn, Cu, Mg, Na, K and Ca were determined and the concentrations of the elements were presented in mg/L.

Power analysis: [10]the power analysis can be done by the calorimetric analysis of a heating load and then observing the thermal characteristics. The load could be any material commonly subjected to microwave application (like cooking) e.g. edible oil etc. we have taken coconut oil as the load.

RESULT AND DISCUSSION

The results of the Phytochemical components are presented in table1, Physicochemical Properties are in Table 2, while those of and Mineral Composition are in Table 3 and power analysis are in table 4-6 respectively.

Table 1: Phytochemical evaluation

S.No	Phytoconstituents	Observation		
		Sample-1	Sample-II	Sample-III
1	Flavonoids	+	+	+
2	Phenols	-	-	-
3	Tannins	-	-	-
4	Saponins	+	+	+
5	Phlobatanins	-	-	-
6	Alkaloids	+	+	+
7	Steroids	+	+	+
8	Terpenoids	+	+	+
9	Cardiac glycosides	-	-	-
10	Anthraquinones	-	-	-

Table 2: Physicochemical evaluation

S.No	Physicochemical Parameters	Observation		
		Sample-1	Sample-II	Sample-III
1	Saponification value (mgKOH/g)	6.23	7.75	8.21
2	Peroxide value (mEqH ₂ O ₂)	9.98	10.02	11.06
3	%Free fatty acid	23.58	22.63	25.97
4	Acid value (mgKOH/g)	0.79	0.97	0.86
5	Iodine value (gI ₂ /100g)	42.6	46.8	44.6
6	Specific gravity (g/l)	0.93	0.95	0.89

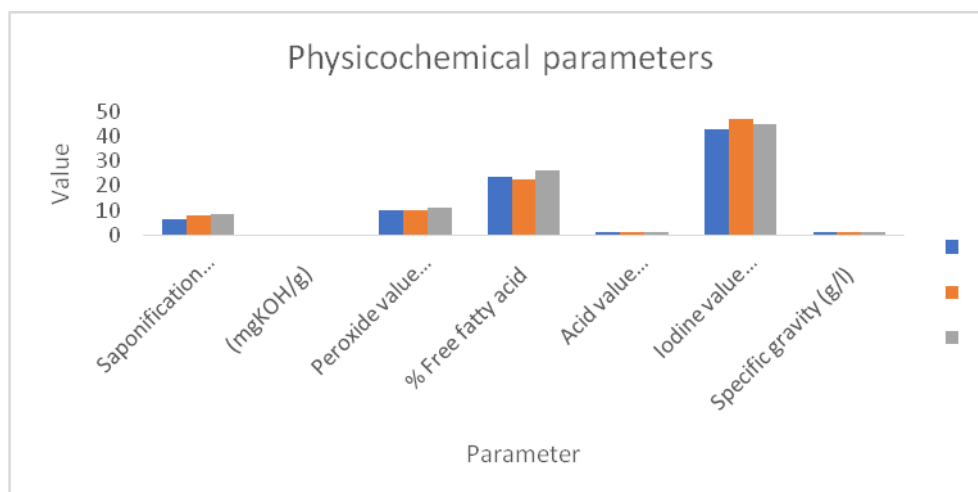


Figure 1: physicochemical parameter

Table 3: Mineral composition

S.No	Element	Concentration (mg/L)		
		Sample-1	Sample-II	Sample-III
1	Zinc(Zn)	0.23	0.42	0.32
2	Iron (Fe)	1.75	1.58	1.67
3	Copper (Cu)	0.03	0.07	0.05
4	Manganese (Mn)	0.17	0.15	0.12
5	Magnesium (Mg)	0.23	0.28	0.24
6	Calcium (Ca)	1.58	1.36	1.29
7	Potassium (K)	2.87	3.23	2.98
8	Sodium (Na)	2.13	2.78	2.35

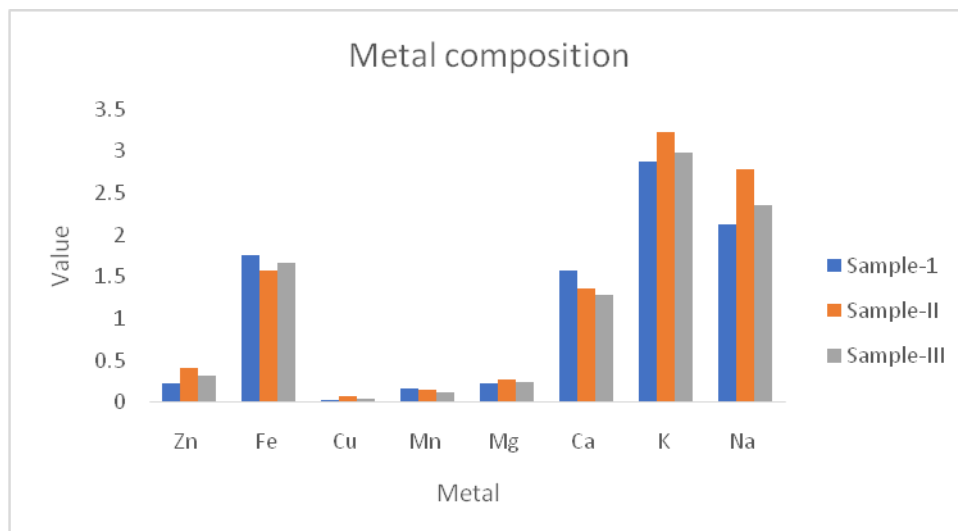


Figure 2: Mineral composition

Table 4: Power analysis of 50ml of coconut oil as load at 230V with heating time, t=60, 90, 120 seconds.

Sample	Temperature (C)			Result						Load (V)	Volume (ml)
	Initial	Final	ΔT (C)	Time (S)	Power (W)	Time (S)	Power (W)	Time (S)	Power (W)		
I	26	40	14	60	36.485	90	28.010	120	26.485	230	50
II	26	40	14	60	33.941	90	25.628	120	23.941	230	50
III	26	40	14	60	52.672	90	34.994	120	32.672	230	50
Average Power				41.032		29.544		27.699			

Table 5: Power analysis of 50, 100, 150 ml of coconut oil as load at 230 V with heating time, t=60 seconds.

Sample	Temperature (C)			Result						Load (V)	Time (S)
	Initial	Final	ΔT (C)	Volume (ml)	Power (W)	Volume (ml)	Power (W)	Volume (ml)	Power (W)		
I	26	40	14	50	36.485	100	48.010	150	66.485	230	60
II	26	40	14	50	33.941	100	55.628	150	73.941	230	60
III	26	40	14	50	52.672	100	74.994	150	92.672	230	60
Average Power				41.932		59.544		77.699			

Table 6: Power analysis of 100ml of coconut oil as load with heating time, t=60 seconds at 180, 200, 220 V.

Sample	Temperature (C)			Result						Volume (ml)	Time (S)
	Initial	Final	ΔT (C)	Load (V)	Power (W)	Load (V)	Power (W)	Load (V)	Power (W)		
I	26	40	14	180	28.485	200	42.015	220	56.485	50	60
II	26	40	14	180	29.946	200	43.628	220	43.941	50	60
III	26	40	14	180	32.672	200	54.994	220	66.272	50	60
Average Power				30.967		46.879		55.566			

Author's contribution statement: Gopala Krishna Devisetty Planned entire study, designed the analysis and wrote the paper, RaithaSuliaman Al-zakwani, Suaad Said al-mayahy, Ruqayyahaya al- Abri collected the data and performed the analysis.

Statistical analysis: The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different studies. The analysis of variance revealed at significance of $P < 0.05$ level is mentioned wherever required.

CONCLUSION

The phytochemical constituents present in the coconut oil are generally moderate in concentration. The coconut oil is a good source of iron, sodium, potassium and calcium because the concentrations of these elements in the oil meet up with the adequate quantity needed by the body daily. Thus, coconut oil has both nutritional and pharmacological benefits and being free from lead, it is safe for human consumption.

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